CASE REPORT

Rotational dislocation of the proximal interphalangeal joint of the finger

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We describe a case of rotational dislocation of the proximal interphalangeal joint of the ring finger. This injury was not initially appreciated and therefore closed reduction failed. The clinical findings included puckering of the skin on the dorsum of the joint and rotational incongruity on radiographs. At open reduction there was interposition of the lateral band. Identification of the pathology allows early successful treatment.

Injuries to the fingers are frequent, with dislocations of the proximal interphalangeal (PIP) joint being the most common ligamentous injury.\(^1,2\) This injury can be classified into dorsal, pure volar or rotatory volar dislocations.\(^2\) Dorsal dislocations are the most common, with rotatory dislocation seen infrequently. Dorsal and pure volar dislocations often reduce spontaneously, or are seen in the emergency department. Rotational dislocations, however, are rarely reducible by closed means, and the signs are often more subtle.\(^1-4\)

Operative procedure. The joint was approached via a curved dorsal incision, the apex of the curve being towards the side of tissue interposition, identified by the ‘dimple’. Dissection allowed exposure of the joint and the button-holed condyle of the proximal phalanx (Fig. 3).

Case report

A 43-year-old right handed woman sustained an injury to her left ring finger while exercising her horse. A forced rotational traction injury to the flexed PIP joint caused dislocation. The patient presented to hospital with her finger held in 60° of flexion. She was initially seen by a nurse practitioner and referred to the available orthopaedic junior as a clinical dislocation. Reduction was attempted under regional block with lidocaine.

An aluminium splint was applied and the check radiographs were deemed acceptable by the doctor (Fig. 1). The patient was discharged and followed up in the fracture clinic four days later.

In the clinic the patient was seen by the consultant upper limb surgeon (MSS) and noted to have a mild flexion deformity at the PIP joint, with ‘puckering’ of the dorsal skin (Fig. 2), swelling and reduced range of movement. The radiographs were re-examined and a rotational incongruity noted. The following day she underwent an unsuccessful manipulation under anaesthesia followed by open reduction of the PIP joint.

Fig. 1
Initial post-reduction radiography demonstrating rotational joint incongruity, on the anteroposterior view and volar subluxation on the lateral view.

Fig. 2
Photograph showing puckering of the dorsal skin. A subtle sign of tissue interposition and complex dislocation (ring finger, proximal interphalangeal joint).
The central slip was identified as being displaced radially, with the ulnar collateral ligament ruptured at its distal attachment. The lateral band was interposed within the joint.

A small longitudinal incision in the capsule allowed reduction of the joint (Fig. 4), which was stable in a full range of movement. The collateral ligament and extensor expansion were repaired and the incision was closed in layers.

Early active mobilisation was initiated immediately. At 13 weeks active range of movement was recorded at +22° to 82°, -8° to 82° and +4° to 48° at the metacarpophalangeal, PIP and distal interphalangeal joints, respectively. Grip strength was 22 kg on the left (injured) side and 31 kg on the right. She was discharged with an active exercise programme.

Discussion

Dislocations of the PIP joint are often seen in the emergency department, with the deformity often having been reduced by the patient at the time of injury, or by the attending doctor on review. The history and examination are the key to treatment, with little to find on a cursory examination. The initial examination must supply details of joint movement and stability, both active and passive. It is at this stage that many dislocations are missed.

Although a rare injury, the rotatory volar type of PIP joint dislocation/subluxation must be identified early and treated appropriately. True anteroposterior and lateral radiographs of the injured joint must be taken. Close inspection of the films will demonstrate subtle subluxation with a rotational incongruity of the joint (Fig. 1). Further imaging with MR allows identification of the interposed structures and detailed evaluation of soft-tissue damage.

Prior to imaging the clinical history of a rotational injury to a flexed digit should give a clue to the underlying pathology. Clinical findings of an irreducible fixed-flexion deformity in a stable joint should point to tissue interposition. We suggest that puckering of the skin overlying the joint gives a useful clinical guide to underlying tissue interposition. As suggested by Kaplan in the 1950s, when describing complex dislocations of the metacarpophalangeal joint, puckering of the skin is pathognomonic of tissue interposition and joint irreducibility. The same sign can be seen in rotational dislocations of the PIP joint, where the lateral band is interposed in the joint. Rupture of the collateral ligament associated with the continuing rotatory force drives the head of the proximal phalanx between the central slip and the lateral bands. The central slip and the lateral band form a noose, preventing reduction of the joint. The volar plate may also rupture during this initial injury.

Reduction of the dislocation can be attempted with the digit flexed at the interphalangeal joints. Flexion allows relaxation of the lateral band and central slip, permitting reduction of the joint via traction and a gentle rotatory motion. If this technique fails, open reduction is usually necessary. The collateral ligament can be repaired at this point, although this is felt to be of functional importance only when the radial collateral ligament of the index finger is involved.

Accurate diagnosis and avoidance of delay in treatment of this injury allows early mobilisation and may reduce long-term consequences of joint stiffness and loss of movement.

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

References